

Abstract of the Disclosure

Provided is a microwave tunable device including a ferroelectric/dielectric $(\text{Ba}_{1-x}\text{Sr}_x)\text{TiO}_3$ (BST) thin film that can reduce dielectric loss of a ferroelectric/dielectric BST thin film. The microwave tunable device of the present research includes: a substrate; and a ferroelectric/dielectric $(\text{Ba}_{1-x}\text{Sr}_x)\text{TiO}_3$ (BST) thin film of a (111) direction which is formed on the substrate. The technology of this research embodies a microwave tunable device by using a ferroelectric/dielectric BST thin film grown in the (111) direction to overcome the limitation of conventional technologies and improve the problem of dielectric loss.